

III WATERSHED CHARACTERISTICS

A. Lake Morphology

Mendums Pond located in Barrington, N.H., is a natural pond raised by damming. The surface area is 102.4 hectares, the mean depth is 4.6 meters, the maximum depth is 14.8 meters, and the volume is 4,734,000 cubic meters. The morphometric information is tabulated in Table III-1. A bathymetric map of the pond can be found in Figure III-1. A map showing the extent of the watershed can be found in Figure III-2.

Table III-1
Mendums Pond Morphological Data

Lake: MENDUMS POND	Lake Area (ha):	102.39
Town: BARRINGTON	Maximum depth (m):	15.9
County: Strafford	Mean depth (m):	6.4
River Basin: Coastal	Volume (m ³):	6567000
Latitude: 43°11' N	Relative depth:	1.4
Longitude: 71°04' W	Shore configuration:	2.23
Elevation (ft): 219	Areal water load (m/yr):	6.79
Shore length (m): 8000	Flushing rate (yr ⁻¹):	1.10
Watershed area (ha): 1442.3	P retention coeff.:	0.61
% watershed ponded: 0.1	Lake type:	natural w/dam

B. Climate

Mendums Pond is located in Barrington, Strafford County, New Hampshire, approximately 45 Km (28 mi.) east of the capitol city, Concord, New Hampshire at coordinates 43°10'30" north and 71°04'00" west.

The climate of the region is characterized by moderately warm summers, cold, snowy winters, and ample rainfall. The weather is occasionally influenced by the Atlantic Ocean which is about 25 miles to the east. However, the prevailing winds are from the west, thus the climate is more influenced by air masses moving in from the interior rather than the air moving landward from the ocean. Daily temperatures can be quite variable because of changing weather patterns that alternately transport warmer air from a southerly direction and colder air from a northerly direction.

Mendums Pond

Barrington

Rough Bathymetric Chart
WSPCD - 1987
sounded by fathometer

10 ft. isobaths

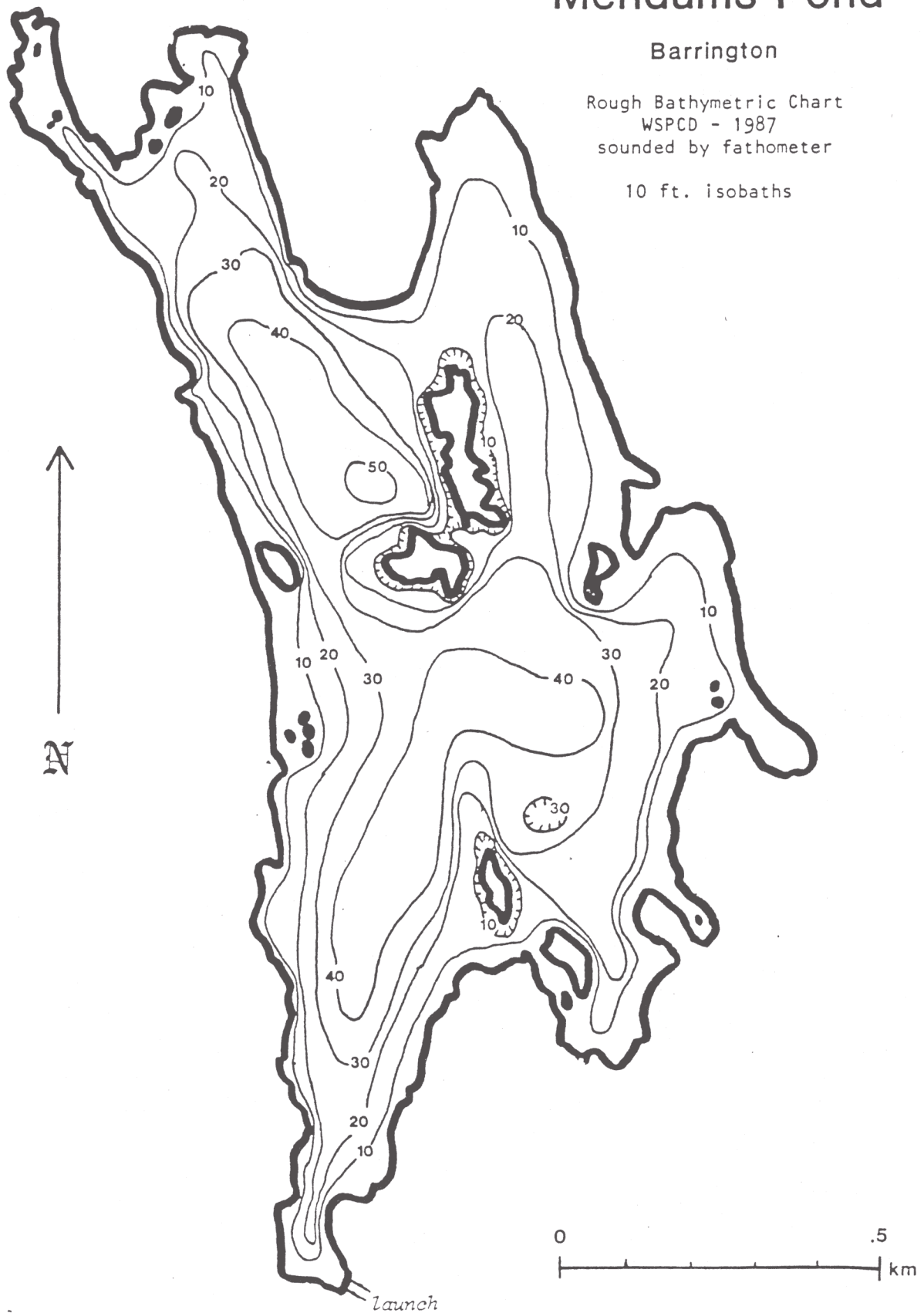








Figure III-1 Mendums Pond Bathymetric Map

III-2

MENDUMS POND WATERSHED: BASE MAP FEATURES

-  Lamprey River watershed boundary
-  Mendums Pond watershed boundary
-  Subwatershed boundaries
-  Shoreline or perennial stream
-  Intermittent stream or inlet stream not shown on USGS map
-  Municipal boundary

-  Water body
-  Wetland

Data sources:

Watershed divides compiled and digitized at Water Resources Division, DES,
and at Office of State Planning; source scale 1:24,000.
All other features from USGS Digital Line Graph data, source scale 1:24,000.

351.6 Acreage of subwatershed

SCALE: 1 in. = 1500 ft.

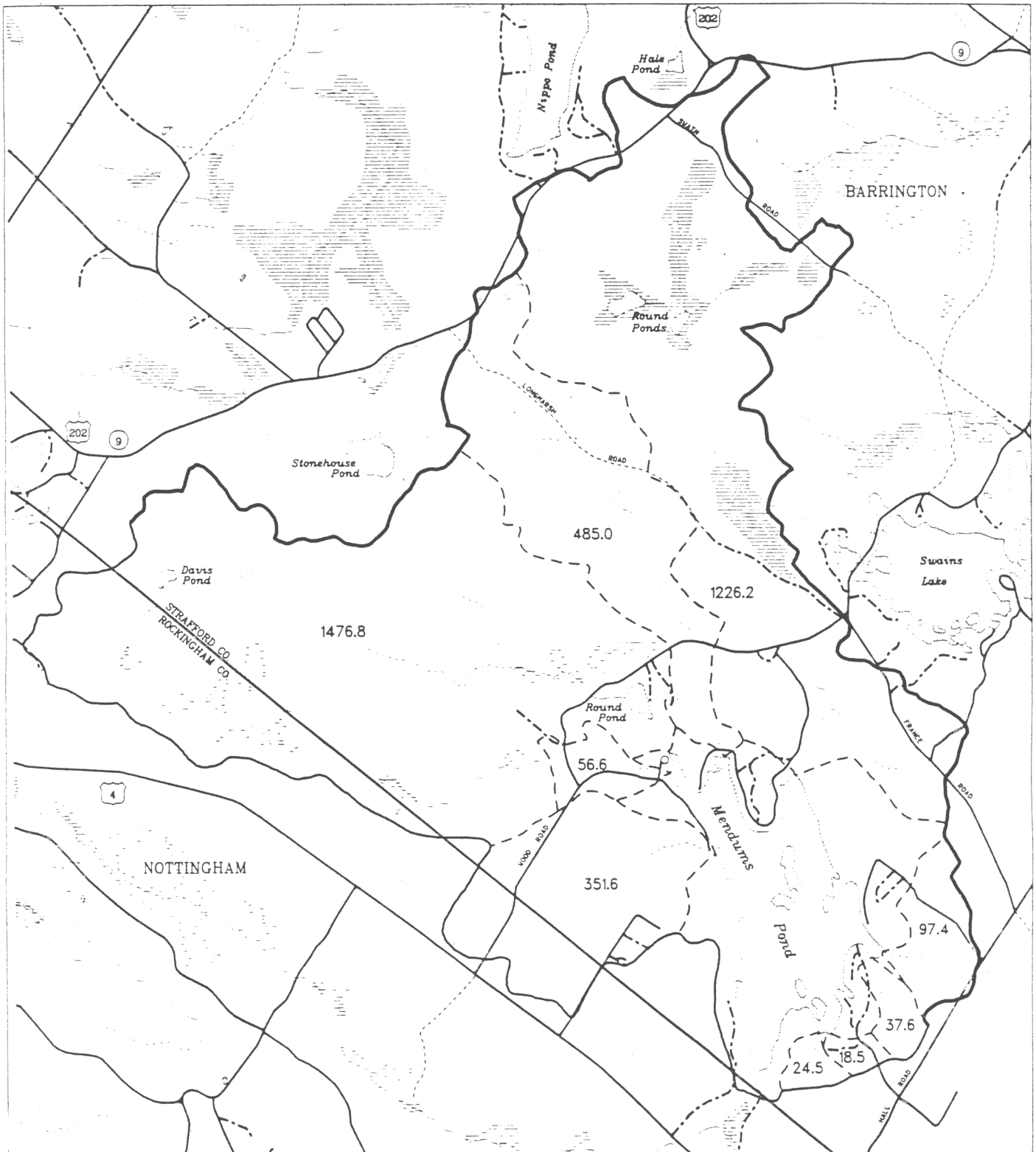


Figure III-2

Prepared at New Hampshire Office of State Planning, January 1992

The total annual precipitation for the study area is about 42.84 inches (Table III-2), including the water equivalent of snow. Generally, snow is present from mid-December to the end of March. Precipitation in this region is acidic.

C. Geology

Approximately 355 million years ago most of central and southeastern New Hampshire was under a great inland sea. Erosion lowered and removed highlands over hundreds of millions of years; streams flowing westward carried large amounts of sand and mud into the inland sea overlying New Hampshire. This continued until all the rocks of sedimentary origins were deposited leaving a great sheet of sand and mud more than 20,000 feet thick below the inland sea. The sea receded about 290 million years ago leaving the land dry.

Rocks derived from sediments became phyllites, which are micaceous rocks similar to roofing slate, mica schists and quartz-mica schists. These sedimentary rocks were then exposed to erosion by wind and rain activity. They also went through severe buckling and folding due to forces exerted on the eastern shore. Magma rose up from the earth and invaded these folds and fractures. This formed pegmatite dikes with embedded quartz, feldspar and mica, which are common in the area. Pressure and heat caused the sedimentary rocks to metamorphose into quartzites, schists, mica, garnet, chlorite, black mica, staurolite and silimanite, depending on the original sediment type.

Approximately 275 million years ago there was another period of stress on the earth's crust. This magma slowly intruded fractures and changed its composition to produce black, coarse-grained, granite-like rock. This type of rock can be observed at Pawtuckaway State Park about 5 miles southwest of Mendums Pond.

The Great Ice Age began about 2 million years ago. This had a tremendous effect on the topography and geology of northern United States. Starting in Labrador and Canada, ice spread out in all directions forming a massive glacier. It reached southeastern New Hampshire from the northwest, which is evident from scratches and grooves on rock surfaces and by the shape of hills carved or deposited by the glacier.

When the glacier began to melt, material picked up and carried in the bottom ice was redeposited on the bedrock, forming hardpan or till. The ice-laid till consists of unsorted fine, medium and large particles.

Table III-2
Monthly Precipitation for Mendums Pond (inches)

	Concord	Durham	Epping
Nov '87	2.50	2.60	2.38
Dec '87	1.55	2.15	2.29
Jan '88	1.97	1.06	2.25
Feb '88	2.24	2.37	3.30
Mar '88	1.32	2.38	2.32
Apr '88	2.75	4.22	3.50
May '88	3.35	4.02	5.37
Jun '88	0.80	2.29	1.99
Jul '88	6.53	8.13	9.66
Aug '88	5.44	5.94	5.46
Sep '88	1.56	2.63	2.49
Oct '88	1.23	3.22	3.93
Total	31.24	41.01	44.67

Pre-glacial streams were dammed by this till and glacial outwash to form the many lakes, ponds and marshes common in the area. The meltwater from the glacier caused the sea level to rise, drowning the Lamprey and Piscassic River Valleys, resulting in tidal estuaries. Once the weight of the ice was removed, the land slowly rose. Sea level dropped and the estuaries were drained. The streams and rivers resumed the erosion of the newly exposed land.






Natural lakes in the region are relatively young geological features and are all due to the modification of the surface by the ice sheet.






Many of the natural lakes in the Lamprey River watershed include:

- (1) Rock basin lakes formed in depressions in valleys scoured out and overdeepened at favorable places by advancing ice.
- (2) Drift-dammed lakes formed either during ice advance or recession, by deposition of more drift in one part of a valley than in another.
- (3) Kettle hole lakes formed in depressions left by the melting of ice blocks around or over which outwash material was deposited by streams of meltwater from the waning glacier or its remnants. Many of these lakes and ponds are quite small, although some are greater than 100 acres. Kettle hole lakes always occur in association with meltwater deposits rather than with till. Many of these lakes tend to be shallow, and have low, sandy or gravelly shores.

More specific to the Mendums Pond watershed; the bedrock of the north western and northern shore is quartz monzonite. This is medium-grained to coarse-grained; massive to foliated quartz monzonite also known as Concord granite (Freedman, 1980). The southeastern shore bedrock is of the Berwick formation. The rocks of the Berwick formation are purplish - brown biotite schist, gray quartz-mica schist, greenish-gray actinolite granulite and brown biotite-actionate schist (Billings, 1980). Figure III-3 shows the geology of the Mendums Pond Watershed.

MENDUMS POND WATERSHED: BEDROCK GEOLOGY

-  Dtm - Two-mica granite of northern and southeastern NH
-  D3A - Dark gray biotite tonalite of southeastern and western NH
-  Dclm - Concord Granite
-  Sp - Perry Mountain Formation
-  OZb - Berwick Formation

-  Lamprey River watershed boundary
-  Mendums Pond watershed boundary
-  Subwatershed boundaries
-  Geological contact
-  Fault

SCALE: 1 in. = 1500 ft.



Data sources:
 Geology - from Interim Geologic Map of New Hampshire, 1986,
 source scale 1:250,000.
 Watershed divides compiled and digitized at Water Resources Division, DES,
 and at Office of State Planning; source scale 1:24,000.
 All other features from USGS Digital Line Graph data, source scale 1:24,000.

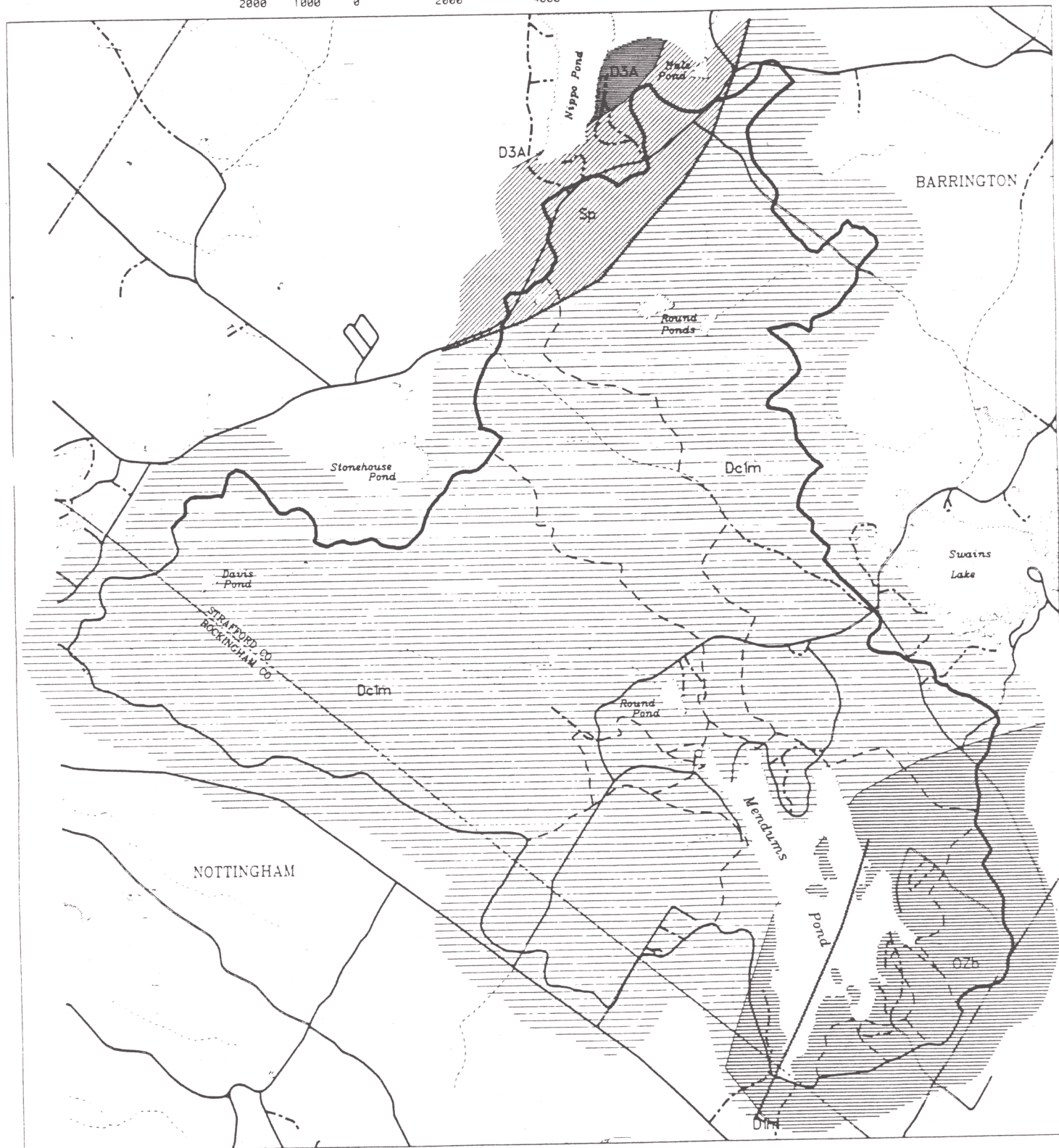


Figure III-3

Prepared at New Hampshire Office of State Planning, January 1992

D. Soils

Most of this area is covered by soils that show moderate to severe limitations for development. The remaining areas of the watershed that show little limitations have already been developed. The Mendums Pond watershed is largely made up of Gloucester soils (Figure III-4). Found primarily in the northern and western parts of the watershed, these soils are excessively drained, strongly acidic, and were formed mainly from granite, gneiss and schist bedrock. Stones and large boulders are commonly found through the soil profile. The average depth to the seasonal high water table is about 3 feet, as is the average depth to bedrock. These soils are suitable for permanent pasture and woodlands.

The following is a description of the sub-group soils found within the Gloucester Association.

GtD - extremely stony fine sandy loam - 8-25%
slopes. Many stones are found on the surface.

GsB - very stony - fine sandy loam - 3-8%
slopes. Large stones common on the surface.

GsC - very stony - fine sandy loam - 8-15%
slopes. Large stones are common, and boulders
in some areas. Unprotected slopes are subject to erosion.

GsD - very stony - fine sandy loam - 15-25%
slope. Large stones are common and boulders in some areas.
Hazard of erosion is severe if protective vegetation is
removed.

Whitman and Paxton series soils are found in patches on the eastern side of the watershed. Whitman soils, in general, are deep, very poorly drained, stony soils in depressions on nearly level uplands. They have a high water table at or near the surface most of the year. Permeability is moderately slow and most uses are limited because of wetness.

Paxton series are found in a small area, but including much of the eastern shore. These soils are well drained, medium to moderately coarse glacial till. The soil is strongly acidic and is derived from mica schist, gneiss and granite bedrock. Movement of water is moderate through the soil above the pan layer which is located at about 18 to 24 inches in depth. The water table seldom rises above the pan layer.

MENDUMS POND WATERSHED: SOILS

Limitations for map systems:

- Severe - wetness (ponding or high water table)
- Severe - wetness at 20" or less
- Severe - slope
- Severe - slow permeation
- Severe - poor filter
- Moderate - wetness large stones
- Moderate - slope
- Slight - poor filter
- Slight

Data sources:

Soils - 1) Strafford Co. soil survey (SCS), published 1973, and
2) unpublished Nottingham Co. soil survey (SCS). Both digitized
at 1:24,000 at Complex Systems Research Center, Durham, N.H.
NOTE: soil units will not necessarily agree across the county
boundary. Both the outline and the definition of the unit may vary.
Federal divides township and digitized at Water Resources Division, SCS,
and at Office of State Planning, source scale 1:24,000.
All other features from USGS Digital Line Graph data, source scale 1:24,000.

SCALE: 1 in. = 1500 ft

FEET
2000 1000 0 2000 4000



NEW HAMPSHIRE



Geographically Referenced Sources
and Information Transfer System

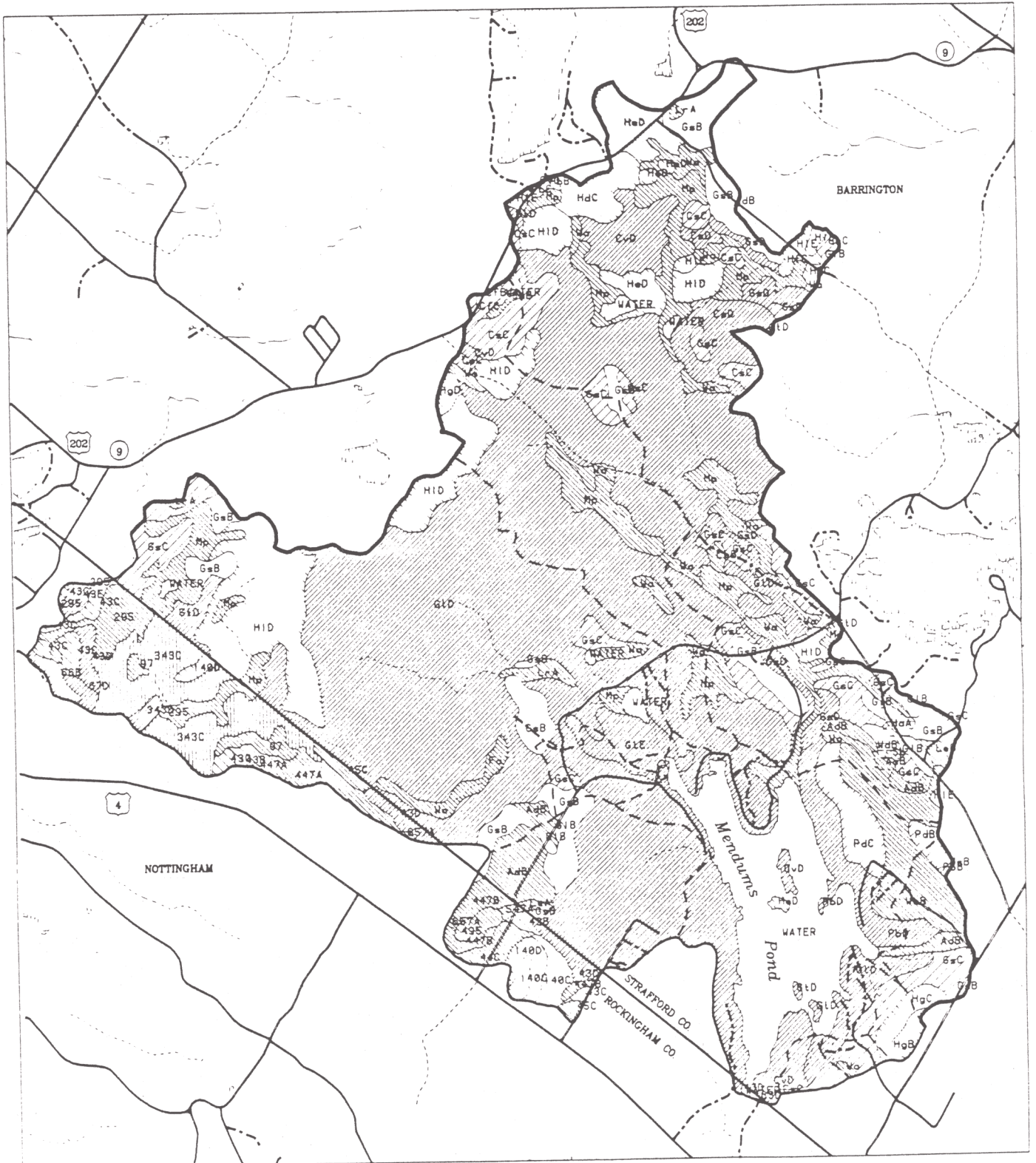


Figure III-4

Prepared at New Hampshire Office of State Planning, January 1992

Very small sections of Charlton, muck and peat, Leicester, Hollis Gloucester, Acton and Charlton series are found scattered around the watershed. A brief description of each follows:

Charlton Series - well-drained loamy soils formed in thick, stony glacial till. Slope range is 3-25%.

Stones are common on surface. Moderate permeability and moderate available water capacity.

Acton Series - deep, moderately well drained soils formed in stony, sandy glacial till. Stones and boulders are conspicuous on the surface. Moderately rapid permeability and low available water capacity. Best soils for forestry use.

Hollis Series - shallow, excessively drained soils that formed in a thin mantle of loamy glacial till. Less than 20 inches deep over bedrock. Rock outcrops common. Slopes range 3 to 60%. Moderate permeability and moderate available water capacity.

Muck and peat - organic matter in deposits that are 18 inches to more than 10 feet deep, but mostly at least 3 feet deep. Groundwater near to surface. Extremely acid.

E. Land Cover & Land Use Regulation

Land use within the watershed is extremely important in determining areas which are potential nutrient contributors to a lake system. Certain uses, such as agricultural or urban can accelerate lake eutrophication.

The entire watershed of Mendums Pond has been zoned as residential use. Several small businesses exist on town roads that were instituted prior to the zoning regulations enacted in 1980 (Dawn Hatch, Personal Communication, Town Planner). The principal land uses observed in the watershed include rural areas alongside town roads (low density residential) and cottage type dwellings around the periphery of the lake. Figure III-5 shows current land uses in the watershed and was determined by examining aerial photographs obtained from the NH Department of Transportation.

Mendums Pond

Current Land Use

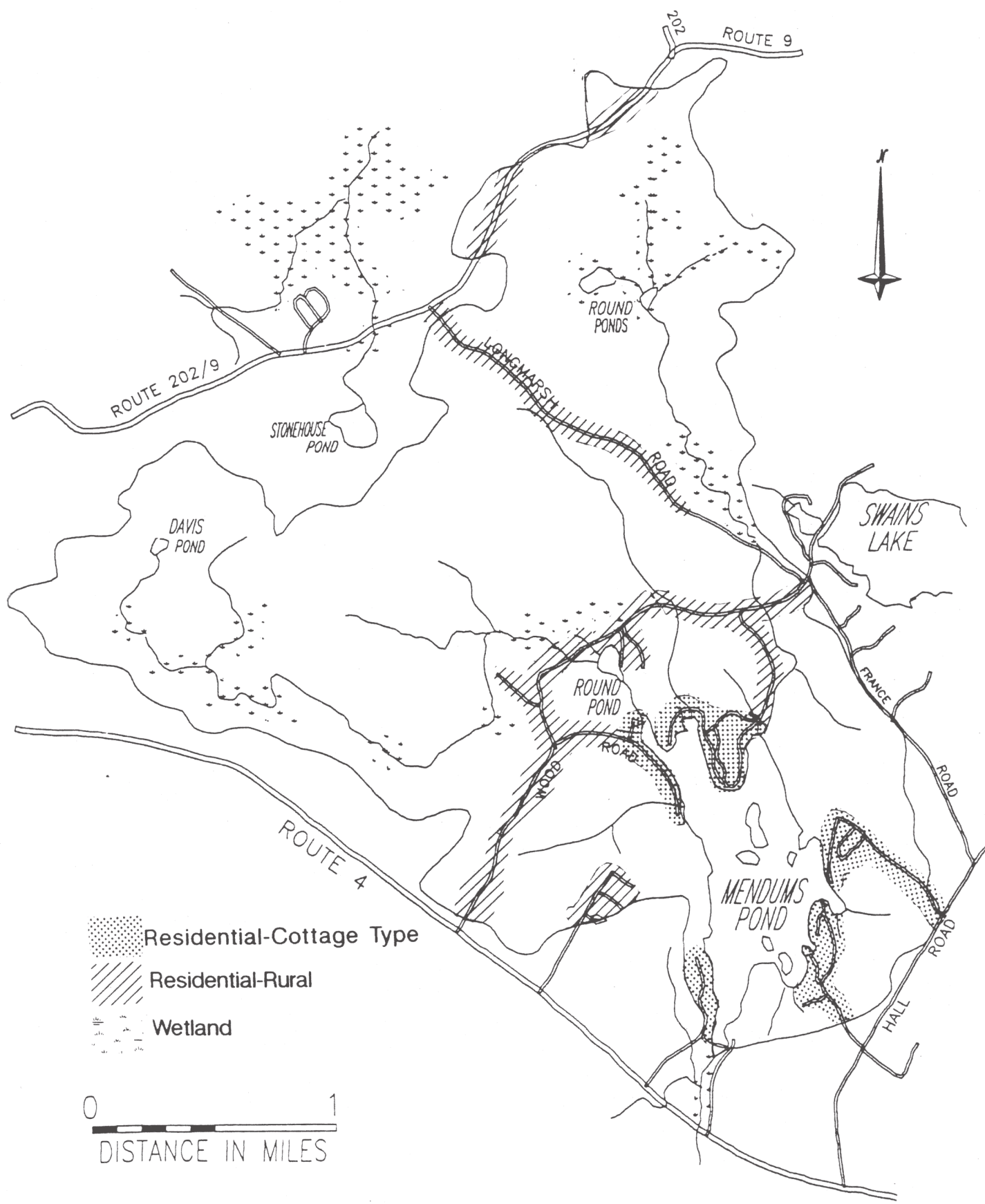


Figure III-5